NETWORK ADDRESS TRANSLATION

Example Topology

FastEthernet0
10.0.0.1/16
NAT Inside

FastEthernet1
174.143.212.1/22
NAT Outside

Address Classification

Inside Local	An actual address assigned to an inside host
Inside Global	An inside address seen from the outside
Outside Global	An actual address assigned to an outside host
Outside Local	An outside address seen from the inside

		Perspective	
		Local	**Global**
Location	**Inside**	Inside Local	Inside Global
	Outside	Outside Local	Outside Global

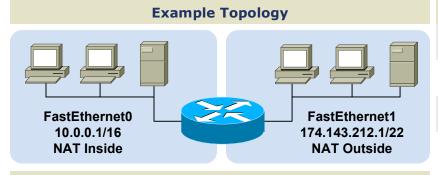## NAT Boundary Configuration

```
interface FastEthernet0
 ip address 10.0.0.1 255.255.0.0
 ip nat inside
!
interface FastEthernet1
 ip address 174.143.212.1 255.255.252.0
 ip nat outside
```

Static Source Translation

```
! One line per static translation
ip nat inside source static 10.0.0.19 192.0.2.1
ip nat inside source static 10.0.1.47 192.0.2.2
ip nat outside source static 174.143.212.133 10.0.0.47
ip nat outside source static 174.143.213.240 10.0.2.181
```

Dynamic Source Translation

```
! Create an access list to match inside local addresses
access-list 10 permit 10.0.0.0 0.0.255.255
!
! Create NAT pool of inside global addresses
ip nat pool MyPool 192.0.2.1 192.0.2.254 prefix-length 24
!
! Combine them with a translation rule
ip nat inside source list 10 pool MyPool
!
! Dynamic translations can be combined with static entries
ip nat inside source static 10.0.0.42 192.0.2.42
```

Terminology

NAT Pool
A pool of IP addresses to be used as inside global or outside local addresses in translations

Port Address Translation (PAT)
An extension to NAT that translates information at layer four and above, such as TCP and UDP port numbers; dynamic PAT configurations include the **overload** keyword

Extendable Translation
The **extendable** keyword must be appended when multiple overlapping static translations are configured

Special NAT Pool Types

Rotary	Used for load balancing
Match-Host	Preserves the host portion of the address after translation

Port Address Translation (PAT)

```
! Static layer four port translations
ip nat inside source static tcp 10.0.0.3 8080 192.0.2.1 80
ip nat inside source static udp 10.0.0.14 53 192.0.2.2 53
ip nat outside source static tcp 174.143.212.4 23 10.0.0.8 23
!
! Dynamic port translation with a pool
ip nat inside source list 11 pool MyPool overload
!
! Dynamic translation with interface overloading
ip nat inside source list 11 interface FastEthernet1 overload
```

Troubleshooting

```
show ip nat translations [verbose]
```

```
show ip nat statistics
```

```
clear ip nat translations
```

NAT Translations Tuning

```
ip nat translation tcp-timeout <seconds>
ip nat translation udp-timeout <seconds>
ip nat translation max-entries <number>
```

Inside Destination Translation

```
! Create a rotary NAT pool
ip nat pool LoadBalServers 10.0.99.200 10.0.99.203 prefix-length 24 type rotary
!
! Enable load balancing across inside hosts for incoming traffic
ip nat inside destination list 12 pool LoadBalServers
```